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DINOSAURS!

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DILOPHOSAURUS

Dilophosaurus may have been a scavenger, feeding on the remains of dead dinosaurs that it found.

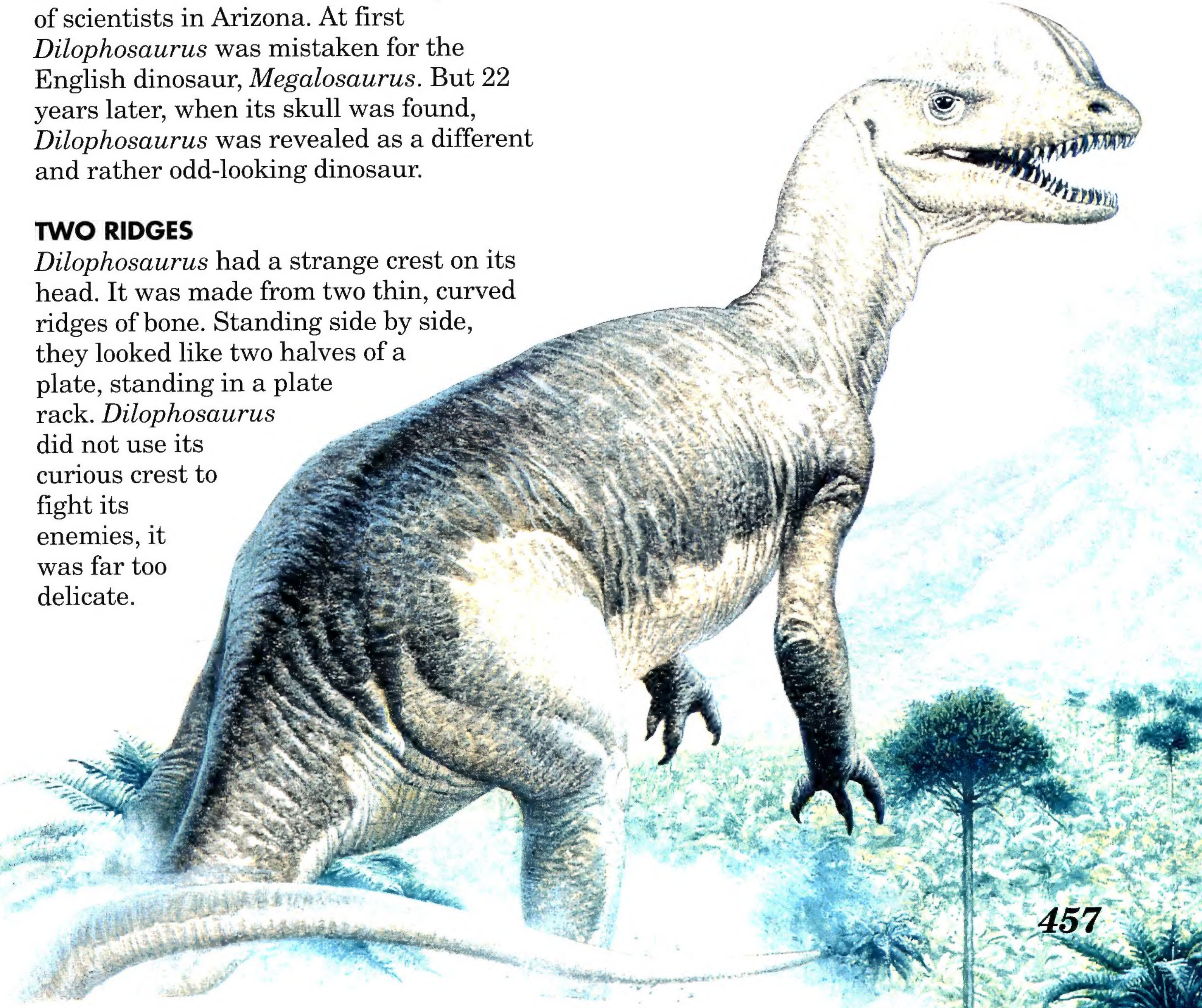
One of the oldest, large, meat-eating dinosaurs, *Dilophosaurus* was about as long as an elephant. An almost complete skeleton was discovered in 1942 by a team of scientists in Arizona. At first *Dilophosaurus* was mistaken for the English dinosaur, *Megalosaurus*. But 22 years later, when its skull was found, *Dilophosaurus* was revealed as a different and rather odd-looking dinosaur.

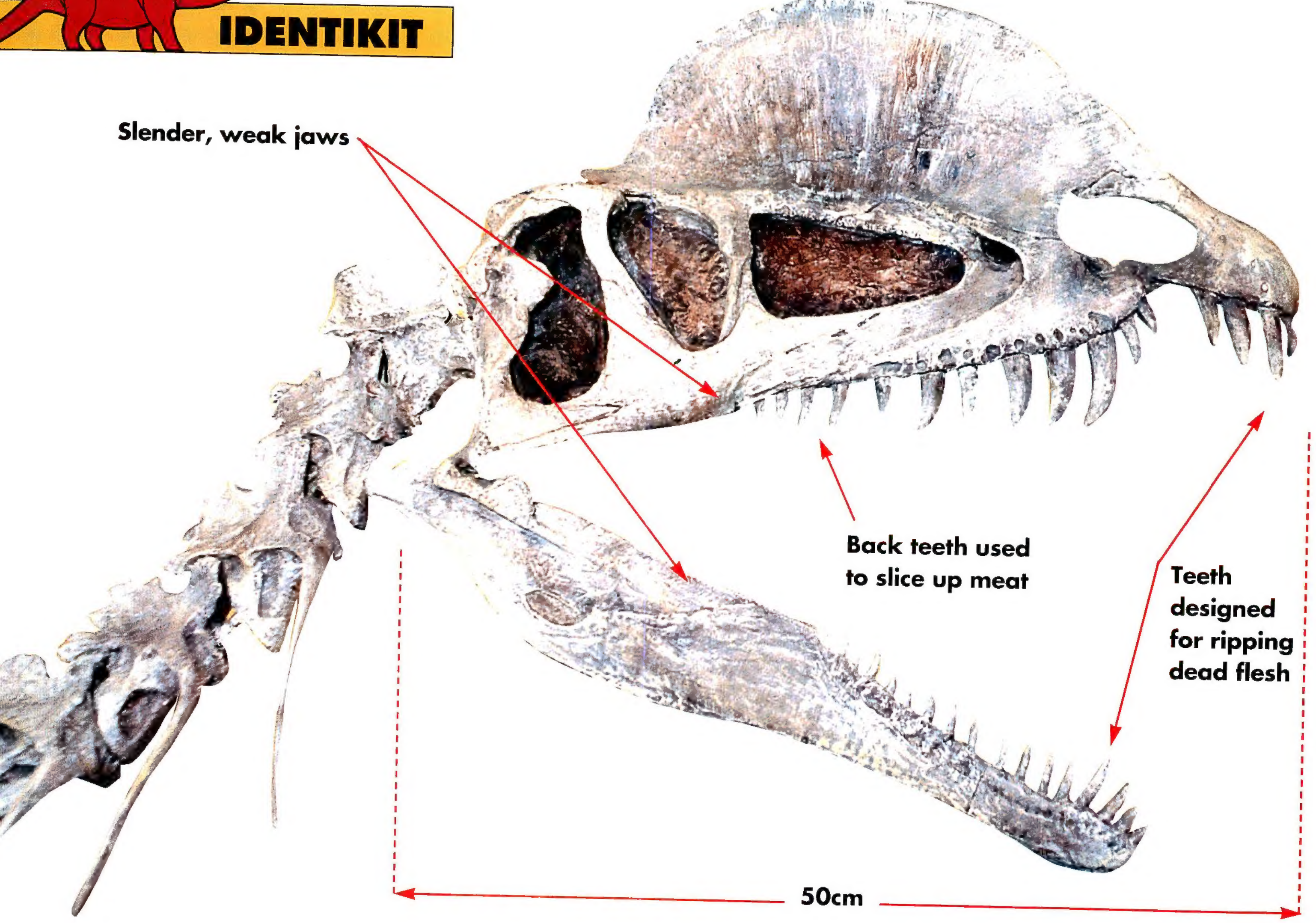
TWO RIDGES

Dilophosaurus had a strange crest on its head. It was made from two thin, curved ridges of bone. Standing side by side, they looked like two halves of a plate, standing in a plate rack. *Dilophosaurus* did not use its curious crest to fight its enemies, it was far too delicate.

SIGHT SIGNAL

Another dinosaur could recognise *Dilophosaurus* quite easily by its crest. With such an odd-shaped head it must have stood out from its surroundings, even from a long way away. Perhaps it used its mysterious crest as a special signal, telling friends and warning enemies that *Dilophosaurus* was on the move.




Slender, weak jaws
Back teeth used to slice up meat
Teeth designed for ripping dead flesh
50cm

WEAK JAWS

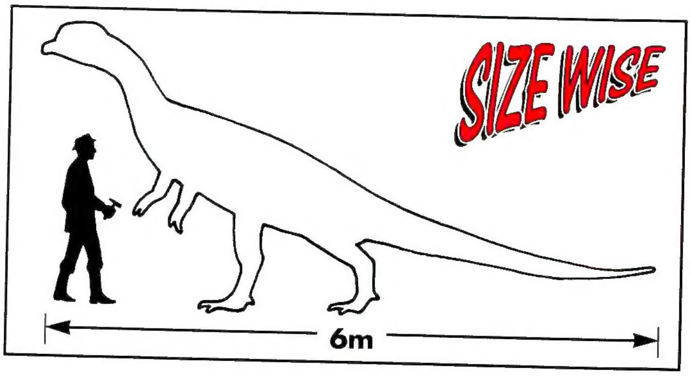
Unlike the carnivorous dinosaurs that lived 40 million years later, *Dilophosaurus* had weak, slender jaws. It may have chased after smaller, plant-eating dinosaurs. But without a powerful bite *Dilophosaurus* was probably not a deadly killer like some of its relatives.

TEARING TEETH

Dilophosaurus had a lazy way of finding its dinner. Rather than using its precious energy to gallop after prey, it probably made a meal of the remains of dead dinosaurs. Long, slim teeth at the front of its jaw were perfect for tearing and plucking at carrion (dead animals). *Dilophosaurus* used its back teeth to slice and cut the meat.

MONSTER FACTS

- **NAME:** *Dilophosaurus* (die-loaf-oh-saw-rus) means 'two-ridged reptile'
- **SIZE:** 6m long
- **FOOD:** meat, possibly dead animals
- **LIVED:** 190 million years ago in the Early Jurassic Period in Arizona, USA

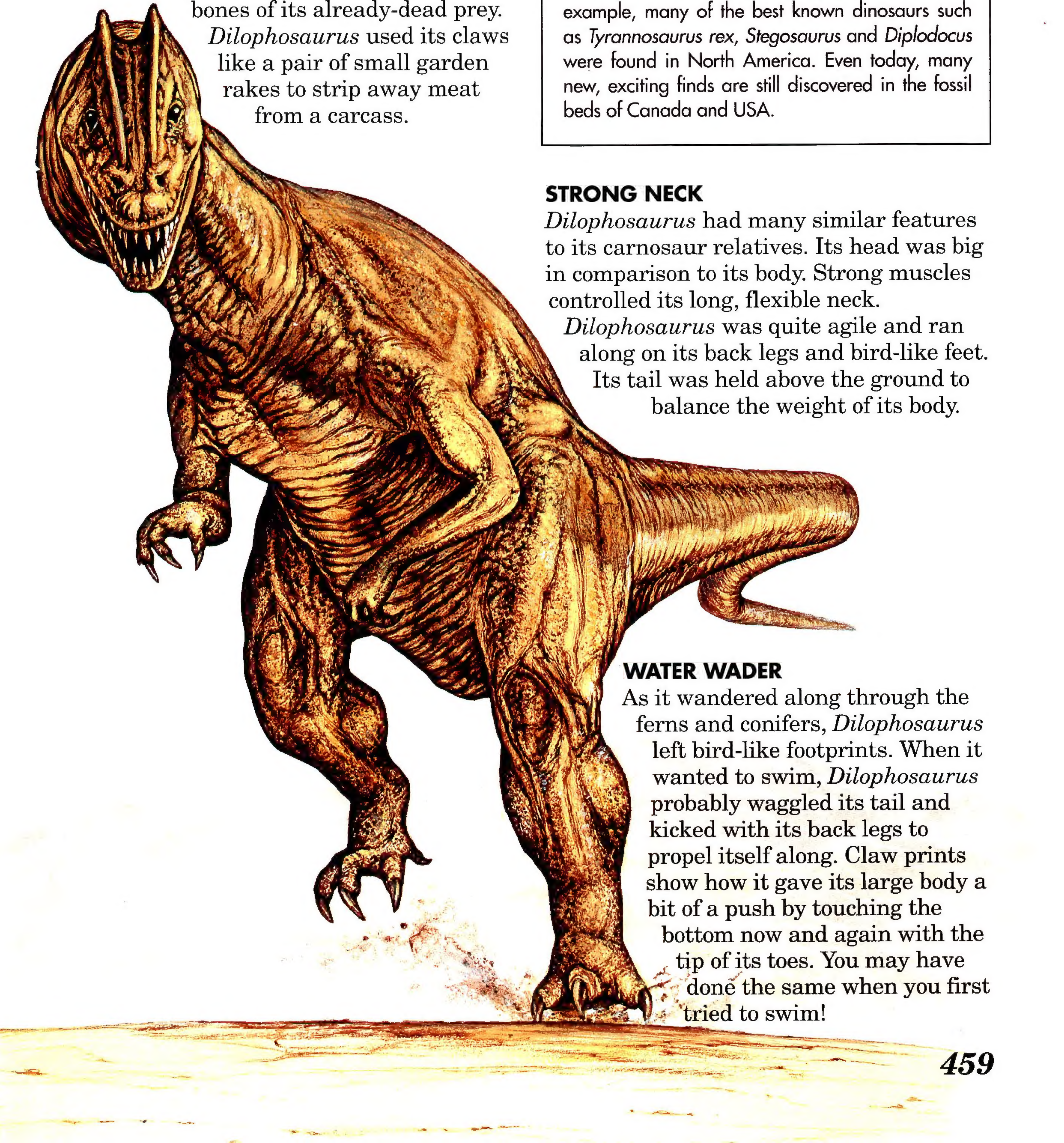


FOUR FINGERS

Dilophosaurus had short, strong arms which were quite high up on its body. On its hand were four fingers. Three of these fingers had sharp claws which were good for ripping the flesh from the bones of its already-dead prey. *Dilophosaurus* used its claws like a pair of small garden rakes to strip away meat from a carcass.

Is it true that North America has the most dinosaur exhibits?

Yes. North American museums have more dinosaur exhibits than anywhere else. For example, many of the best known dinosaurs such as *Tyrannosaurus rex*, *Stegosaurus* and *Diplodocus* were found in North America. Even today, many new, exciting finds are still discovered in the fossil beds of Canada and USA.



STRONG NECK

Dilophosaurus had many similar features to its carnosaur relatives. Its head was big in comparison to its body. Strong muscles controlled its long, flexible neck. *Dilophosaurus* was quite agile and ran along on its back legs and bird-like feet. Its tail was held above the ground to balance the weight of its body.

WATER WADER

As it wandered along through the ferns and conifers, *Dilophosaurus* left bird-like footprints. When it wanted to swim, *Dilophosaurus* probably waggled its tail and kicked with its back legs to propel itself along. Claw prints show how it gave its large body a bit of a push by touching the bottom now and again with the tip of its toes. You may have done the same when you first tried to swim!

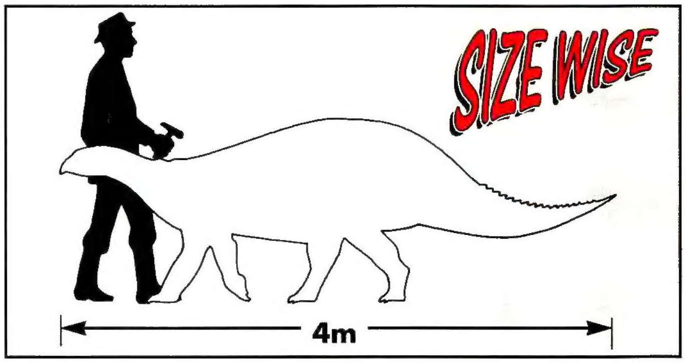
SCELIDOSAURUS

It took a lot of detective work to discover what we know of strange, armoured *Scelidosaurus*.

In 1985 new skeletons of *Scelidosaurus* were discovered on the coast of Dorset, southern England. Added to those found in the last century, these fossils gave scientists a good idea what *Scelidosaurus* really looked like.

CONES AND BUMPS

Just behind its ears *Scelidosaurus* had a cluster of three bony studs. They looked rather like fancy earrings! All along its body the dinosaur's thick skin was covered by a mosaic of rounded scales. Spaced along its back and sides, cone-shaped studs stood out to give *Scelidosaurus* extra protection from predators. If threatened, *Scelidosaurus* probably crouched down low or ran off in a rare burst of speed.

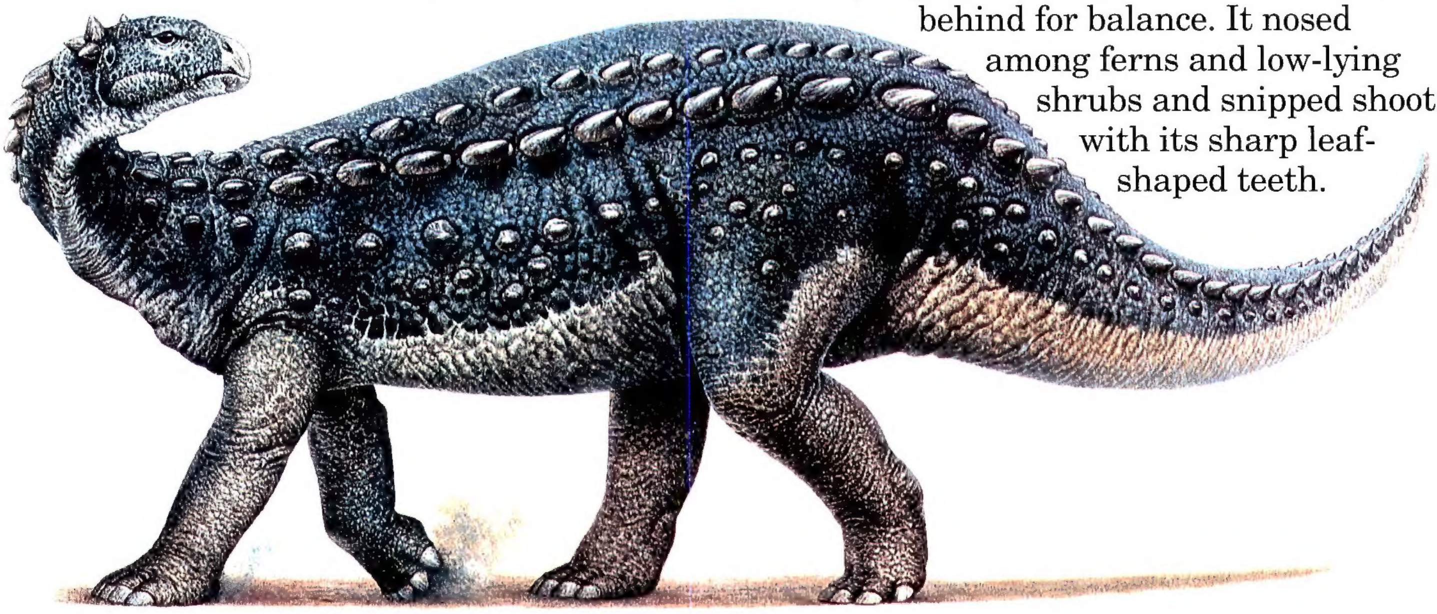


MONSTER FACTS

- **NAME:** *Scelidosaurus* (skel-ide-oh-saw-rus) means 'limb reptile'
- **SIZE:** about 4m long
- **FOOD:** plants
- **LIVED:** about 190 million years ago in the Jurassic in Arizona, USA, England and Tibet

FOUR FOOTED

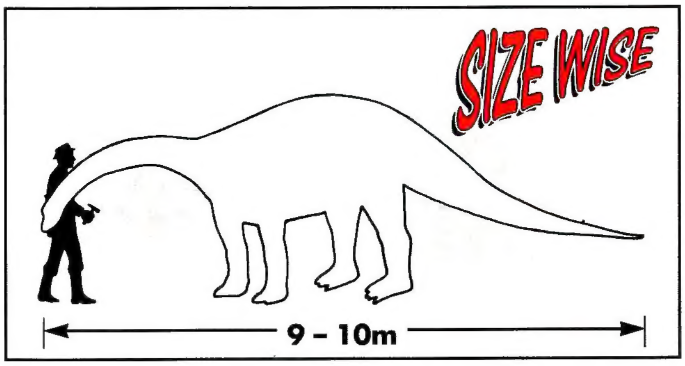
Scelidosaurus stomped along on four heavy legs. A short tail stuck out stiffly behind for balance. It nosed among ferns and low-lying shrubs and snipped shoots with its sharp leaf-shaped teeth.



SHUNOSAURUS

***Shunosaurus* was the first sauropod with a tail club to be discovered.**

Since 1979 more than 10 skeletons of this huge, Chinese dinosaur have been discovered.

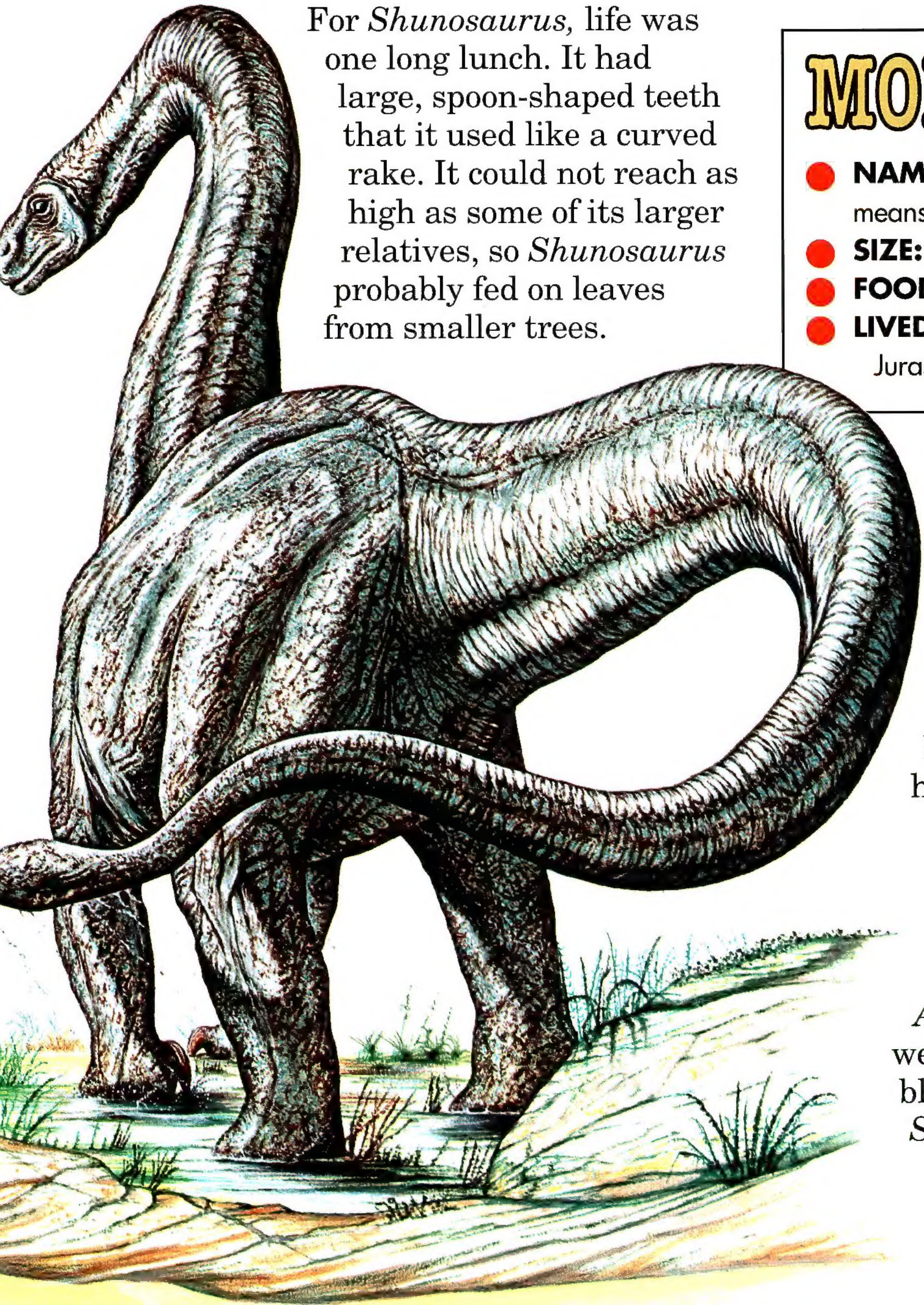


LEAF RAKER

For *Shunosaurus,* life was one long lunch. It had large, spoon-shaped teeth that it used like a curved rake. It could not reach as high as some of its larger relatives, so *Shunosaurus* probably fed on leaves from smaller trees.

MONSTER FACTS

- **NAME:** *Shunosaurus* (shoo-no-saw-rus) means 'Shu (Sichuan) reptile'
- **SIZE:** 9 – 10m long
- **FOOD:** plants
- **LIVED:** about 190 million years ago in the Jurassic Period in Sichuan Province, China



SPECIAL WEAPON

Even though they were so big, plant-eaters like *Shunosaurus* were in constant danger from predators. They had heavy bodies and moved quite slowly on pillar-like legs. However, lucky *Shunosaurus* may have had a special weapon. At the end of its long, muscular tail was a bony club. This solid lump was not in the same league as the massive tail clubs of big armour-plated dinosaurs like *Ankylosaurus.* But this powerful weapon must have dealt a nasty blow when swung from the end of *Shunosaurus'* long tail.

Fur and whiskers

Small, furry mammals waited in the wings to take centre stage when the dinosaurs died out.

Many people think that mammals suddenly appeared when the dinosaurs died out 66 million years ago. In fact, there were mammals all through the Age of the Dinosaurs.

AMONG EARLY MAMMAL GROUPS WERE:-

- **Triconodonts, (TCDs) whose teeth had three cusps (points).**

- **Multituberculates, (MTBs) whose teeth had lots of cusps.**

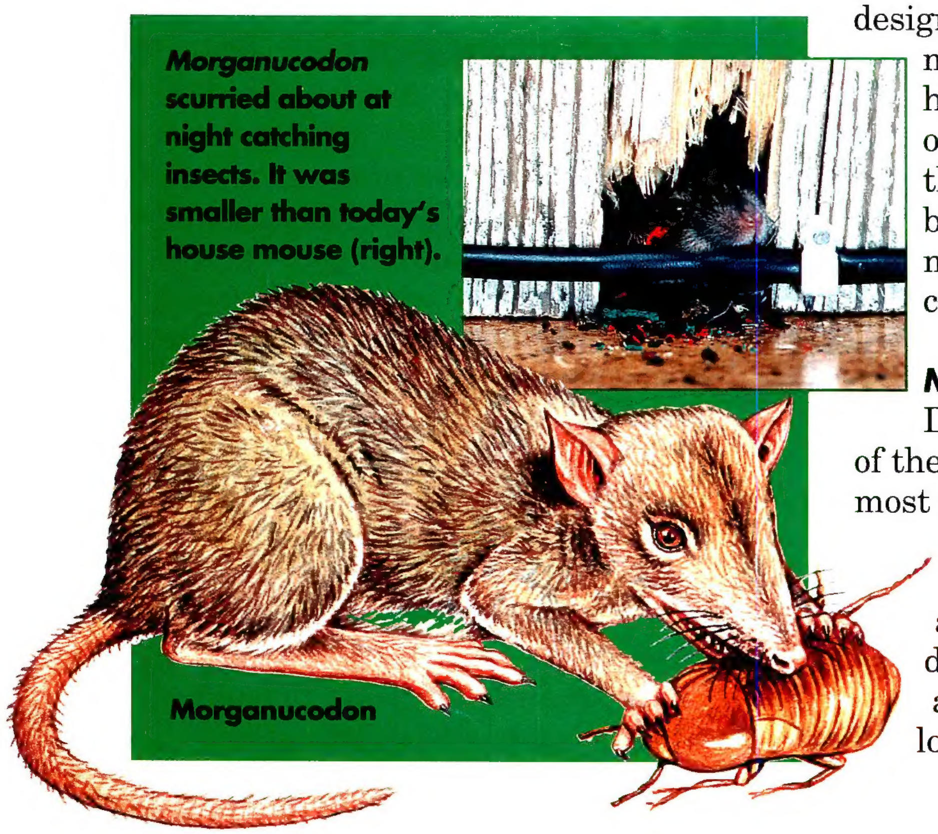
- **Pantotheres, who had teeth of different shapes and sizes.**
- **Monotremes, who sometimes had no teeth, and who are the only survivors today.**

TEETH GALORE

Early mammals had fragile bones, which left few fossils. But their hard teeth made much better fossils. Most of what we know about them comes from their teeth. Scientists even group them by their teeth!

TWO SETS OF TEETH

The earliest true mammals, the triconodonts or TCDs lived over 200 million years ago. *Morganucodon* was one of them. Tiny holes in its nose bones suggest that it had whiskers. If so, it probably had fur, too. Its teeth were designed for eating insects. TCDs were mostly tiny, shrew-like animals that hid among plants catching insects and other small creatures. With fur to keep them warm, they may have been active at night, when most dinosaurs were too cold to hunt.

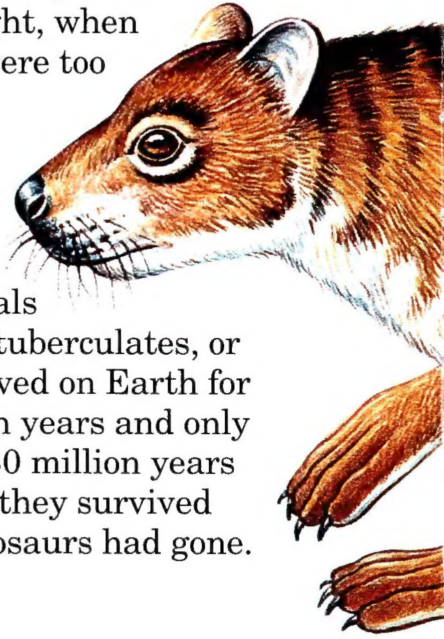


***Morganucodon* scurried about at night catching insects. It was smaller than today's house mouse (right).**

Morganucodon

MTBS

During the Age of the Dinosaurs the most common mammals were the multituberculates, or MTBs. They lived on Earth for about 130 million years and only died out around 30 million years ago. This means they survived long after the dinosaurs had gone.



IT'S A FACT

THAT MAMMAL TEETH ARE COMPLICATED!

Reptiles have simple teeth. New ones grow when old ones wear out. Mammal teeth have many different patterns of cusps (points). These patterns help fossil experts identify the rare fossils of early mammals. Baby mammals suck their mother's milk, so they do not need teeth. They grow their first set of teeth just before they eat solid foods. These first teeth are replaced by adult teeth, which must last a lifetime. (So look after yours!).

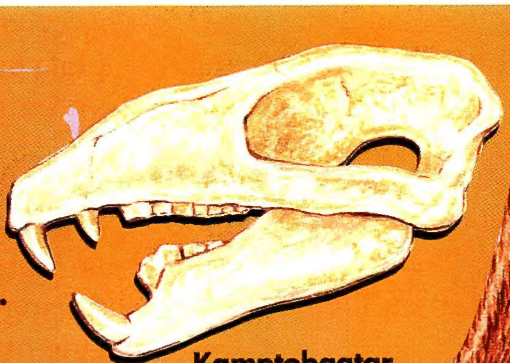
Many MTBs lived in trees, like today's squirrels (left). *Kamptobaatar* (right) could run up and down tree trunks and anchor itself with its tail. It kept its young in a pouch.

SQUIRRELS AND BEAVERS

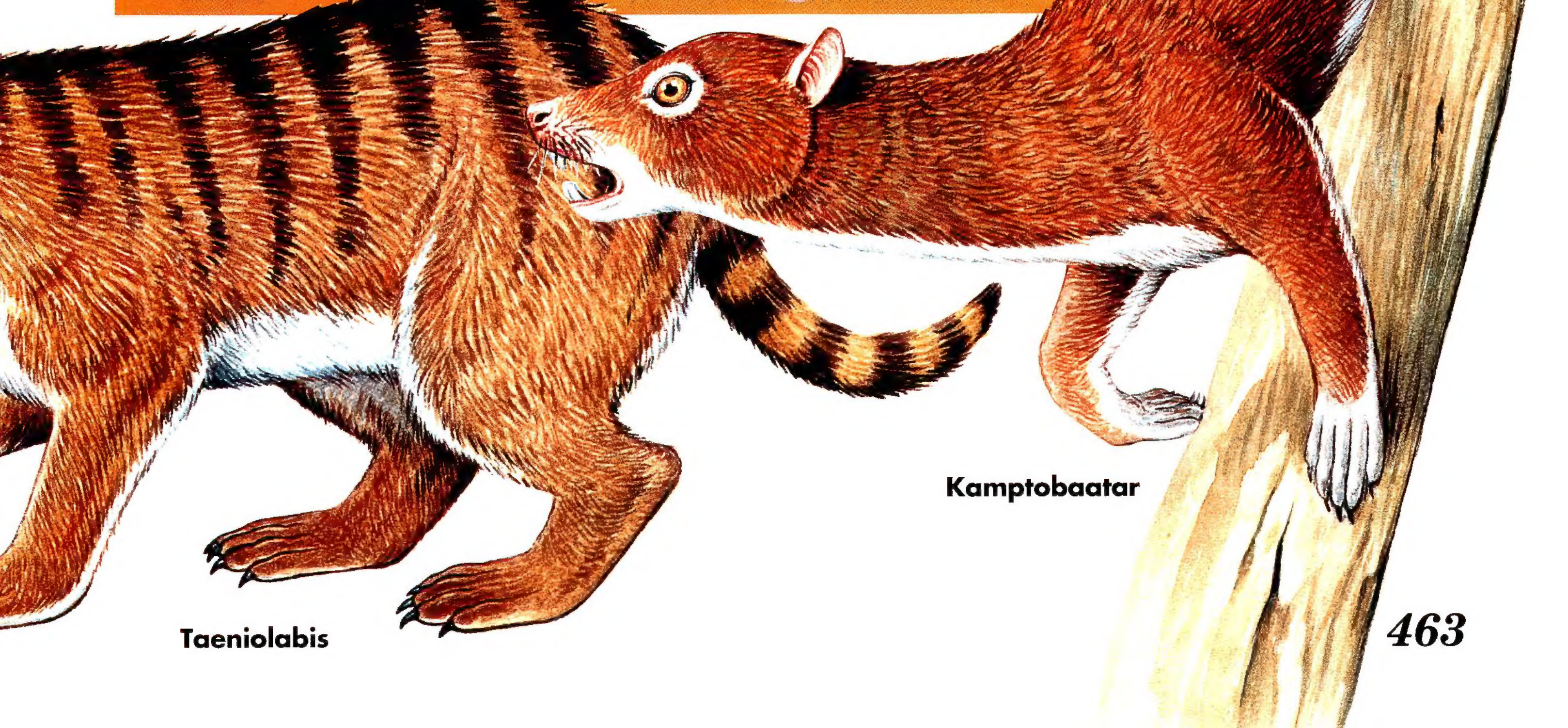
The first plant-eating mammals were MTBs. *Kamptobaatar*'s long tail could grasp branches. Some MTBs became quite large. *Taeniolabis* was beaver-sized and lived just when the dinosaurs died out.

CHISELS AND CRUSHERS

MTBs had teeth like today's rats and mice. There were long chisel-shaped teeth called incisors at the front of the mouth to gnaw tough food, then a gap, and molars with rows of points at the back of the mouth to crush food. Their jaws moved easily so they could crush leafy food well.



Kamptobaatar skull



Kamptobaatar

Taeniolabis

SHORTAGE OF FOSSILS

We have tonnes of fossils of the huge mammals that appeared after the dinosaurs. But fossils of mammals that lived during the Age of the Dinosaurs are scarce. This may be because the creatures themselves were rare. Or they lived and died in places where fossils did not form. Or their bones were so small and delicate that they are lost forever. Or all three.

IN-BETWEEN ANIMALS

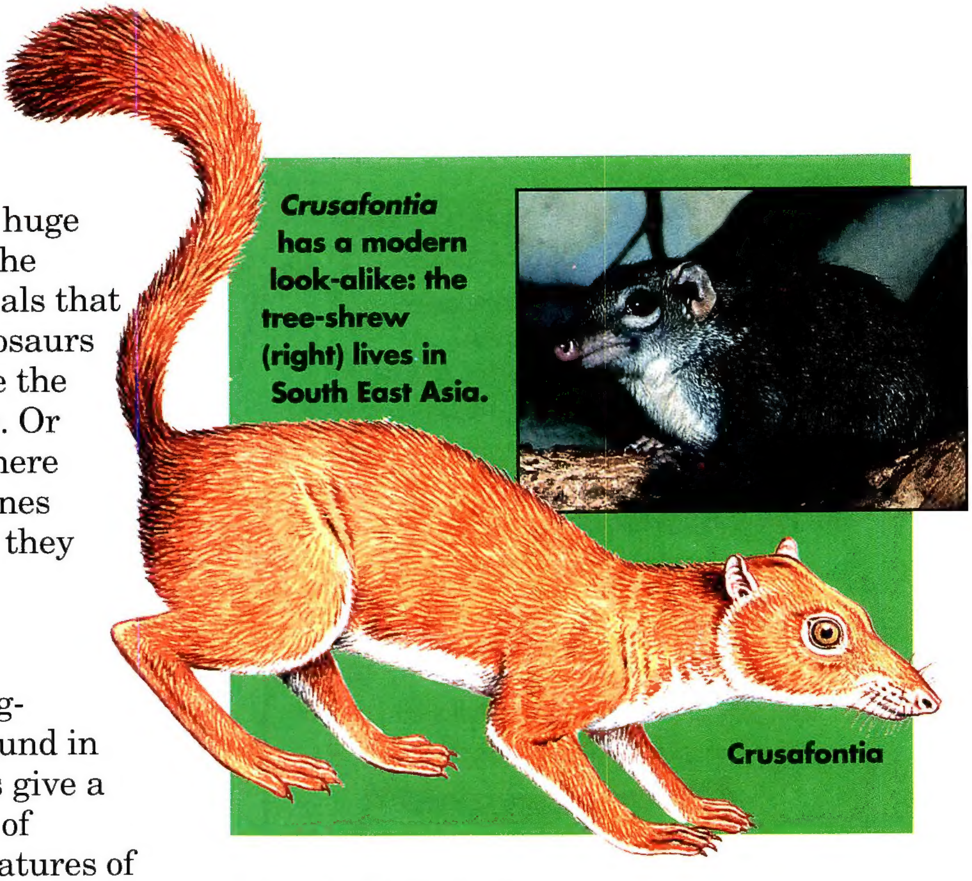
The strange monotremes, or egg-laying mammals, were also around in the dinosaur days. Monotremes give a glimpse of an in-between stage of evolution, because they have features of both reptiles and mammals.

FURRY EGG-LAYERS

Monotremes have fur like mammals, and the mothers make milk to feed their babies. But monotremes lay eggs like reptiles. They are not very good at keeping their blood warm. And their skeleton has many reptile-like bones. The first monotremes appeared 120 million years ago.

The echidna (left) is rare, its monotreme relatives lived 120 million years ago.

The duck-billed platypus has fur and lays eggs like its prehistoric relatives.



Crusafontia has a modern look-alike: the tree-shrew (right) lives in South East Asia.

Crusafontia

SOLE SURVIVORS

Today, only two types of monotreme survive on Earth. They are the duck-billed platypus and the echidna, or spiny anteater, that live in Australia.

LOW PROFILE

Another group of mammals, the pantotheres, kept a low profile during the Age of the Dinosaurs. One example is *Crusafontia*. Palaeontologists have found fossil skeletons of this small, furry animal which are almost complete – amazing for an early mammal!

FOUND DOWN A COAL MINE

These fossils are in pieces of coal from the Guimarota Mine in Portugal. They show that *Crusafontia* lived during the Late Jurassic Period, about 150 million years ago. It looked like a tree-shrew today, with large eyes and long tail, and a body about 20cm in length.

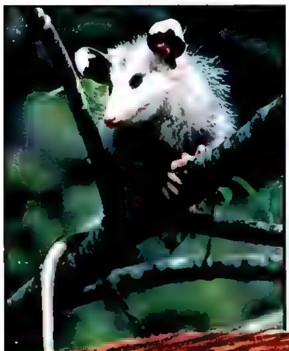
What is ? A NOCTURNAL ANIMAL?

Most reptiles are diurnal, or active in the daylight. They rely on the Sun to keep them warm. In the cool of the night, they become too cold to run about, so they hide and rest. The first mammals were probably easy prey for speedy, fierce, hunting dinosaurs. So it is very likely that they were nocturnal, which means that they were active in darkness. To be nocturnal they needed several features.

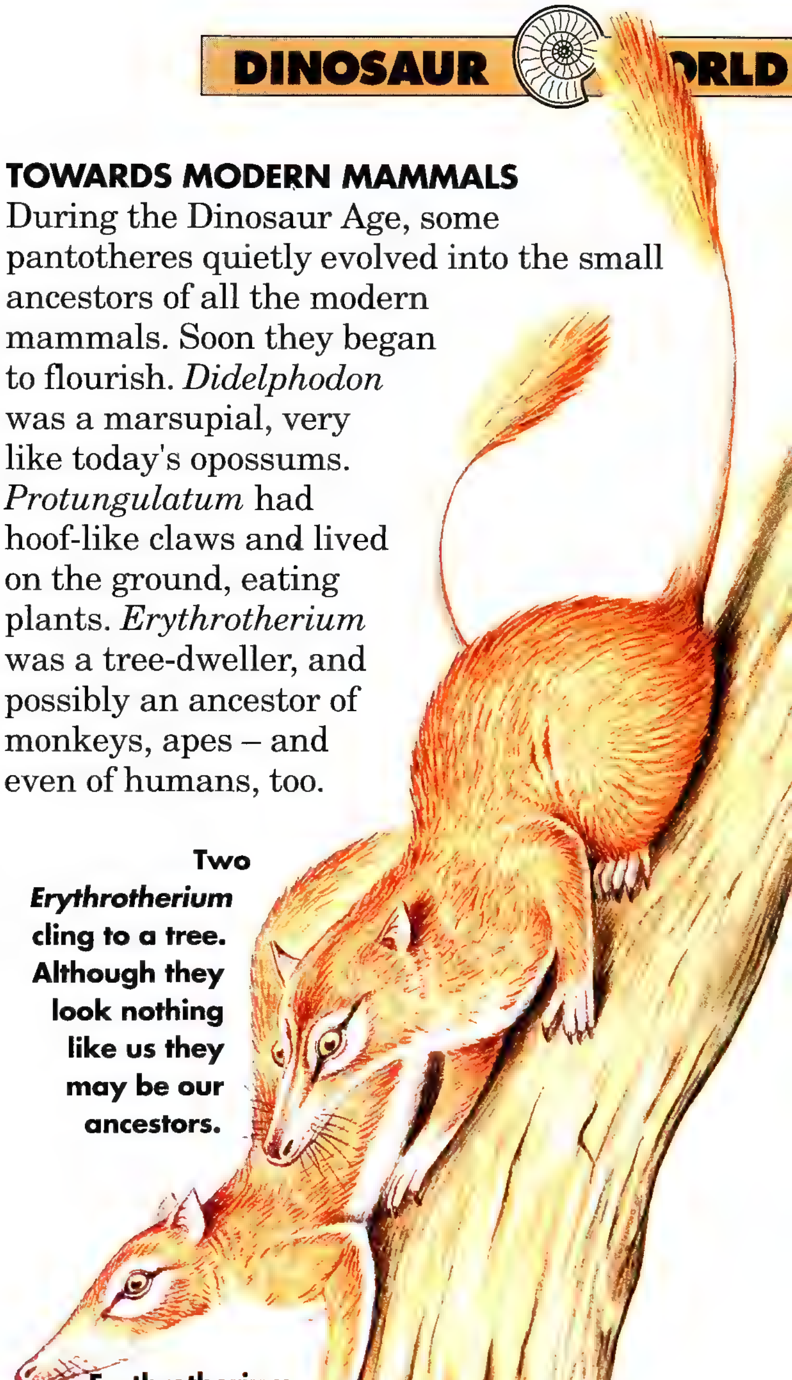
- Warm blood – there was no heat from the Sun.
- Fur (hair) to keep in the body warmth.
- Extra-large hairs, called whiskers, to feel the way in the dark.
- Big eyes and sensitive ears, also to find the way in the dark.
- A relatively big brain, to cope with these new sensations and way of life.

TOWARDS MODERN MAMMALS

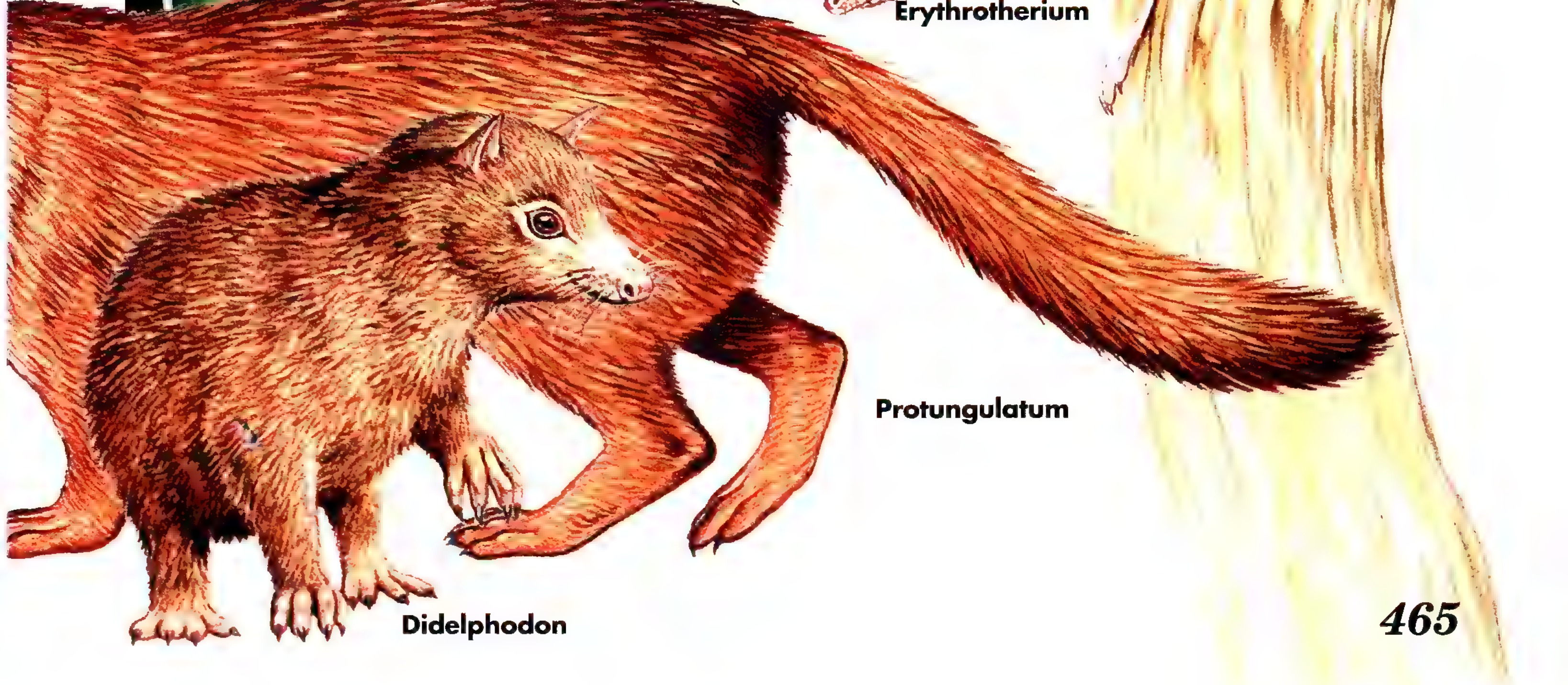
During the Dinosaur Age, some pantotheres quietly evolved into the small ancestors of all the modern mammals. Soon they began to flourish. *Didelphodon* was a marsupial, very like today's opossums. *Protungulatum* had hoof-like claws and lived on the ground, eating plants. *Erythrotherium* was a tree-dweller, and possibly an ancestor of monkeys, apes – and even of humans, too.



Marsupials are animals that keep their young in a pouch. The opossum (left) lives in North America today. It has a pouch just like *Didelphodon* (bottom), one of the ancestors of modern marsupials.

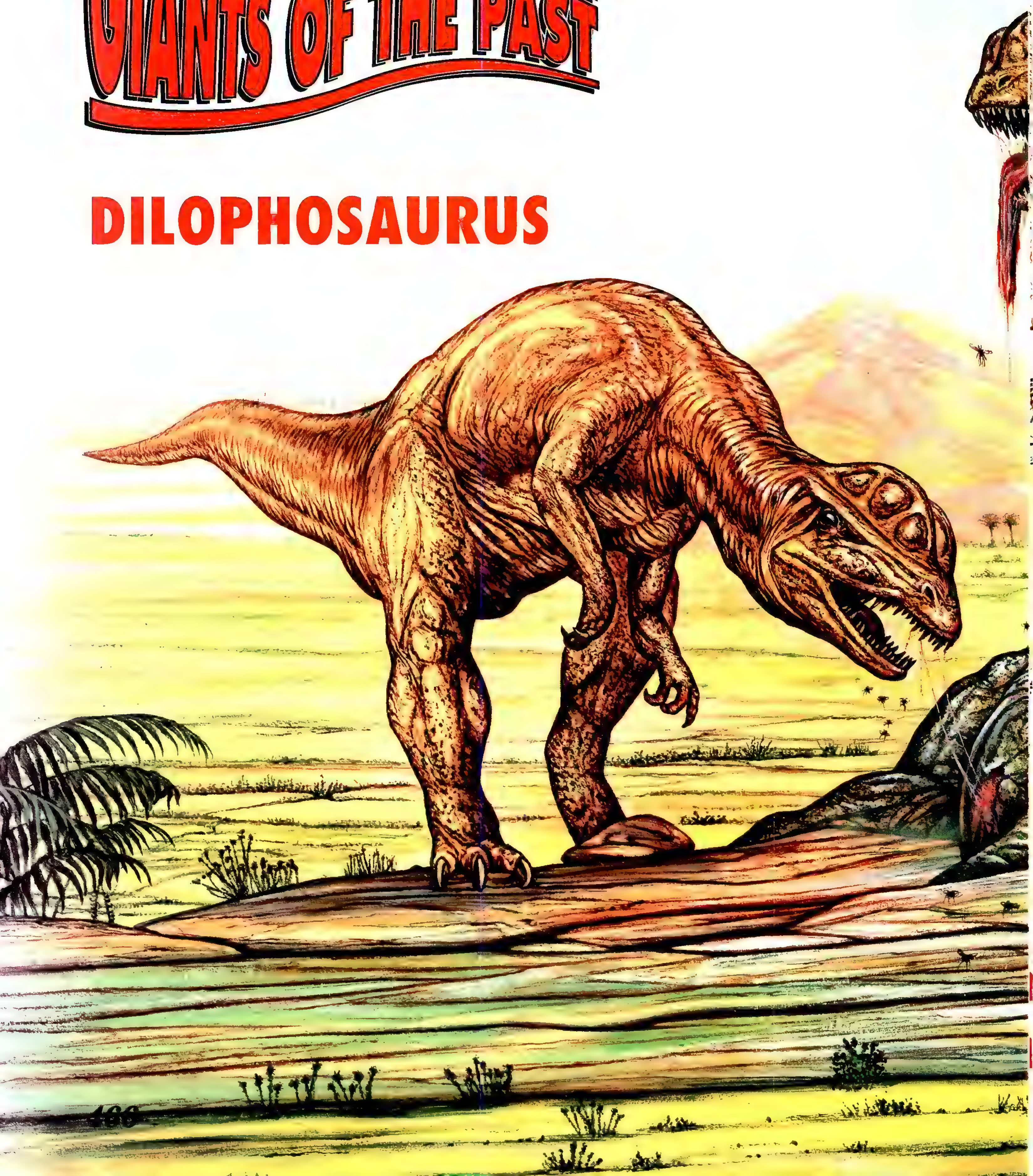


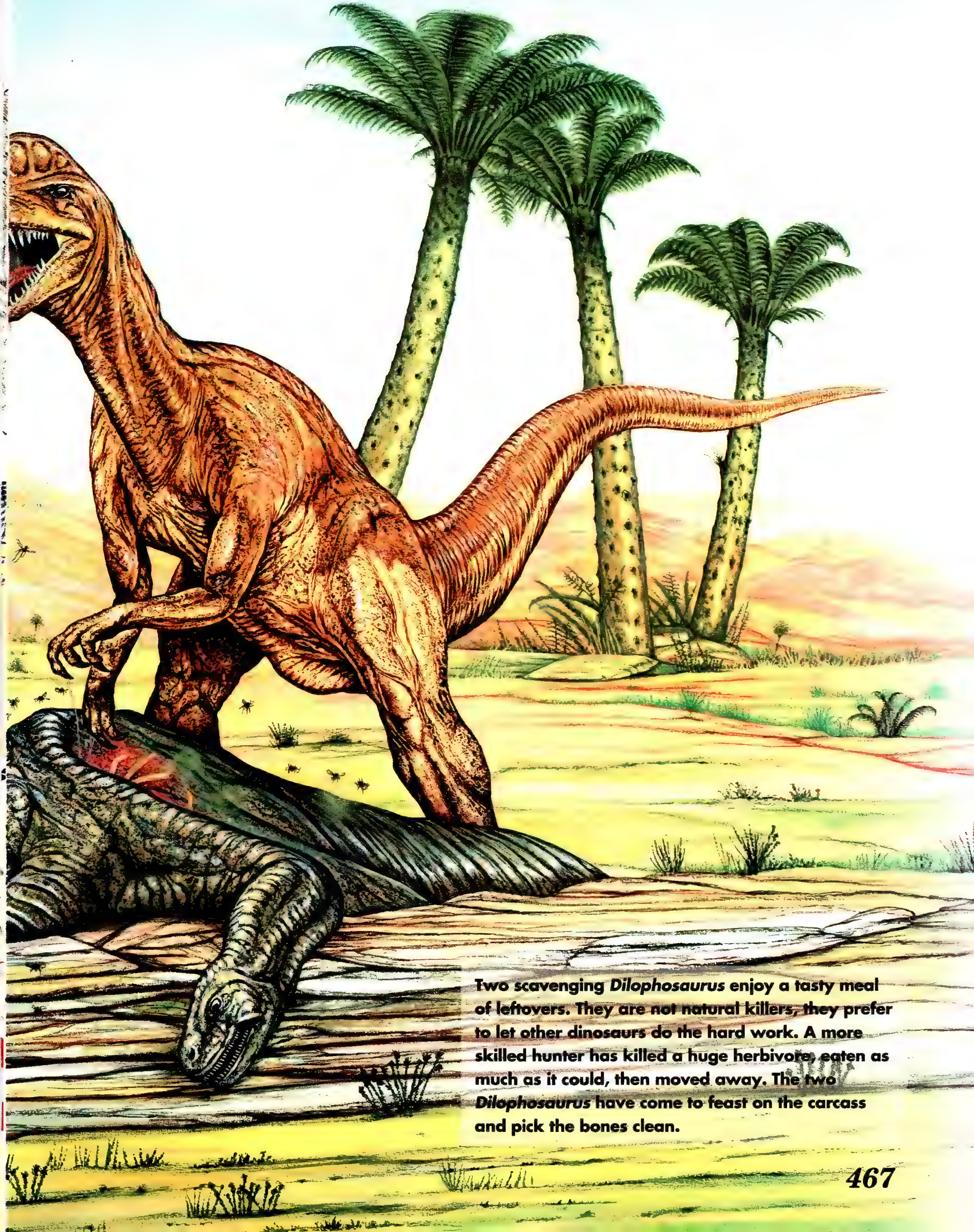
Two *Erythrotherium* cling to a tree. Although they look nothing like us they may be our ancestors.



GIANTS OF THE PAST

DILOPHOSAURUS





Two scavenging *Dilophosaurus* enjoy a tasty meal of leftovers. They are not natural killers, they prefer to let other dinosaurs do the hard work. A more skilled hunter has killed a huge herbivore, eaten as much as it could, then moved away. The two *Dilophosaurus* have come to feast on the carcass and pick the bones clean.

3-D Gallery 29

BARYONYX

- A meat-eater, named after its ‘heavy-claws’
- Lived 130 million years ago in England, UK and Africa
- Measured 9.5m long
- Ate meat, possibly fish

The fastest and the slowest

Imagine a dinosaur race. Which dinosaur do you think would win? Here are the fastest and slowest.

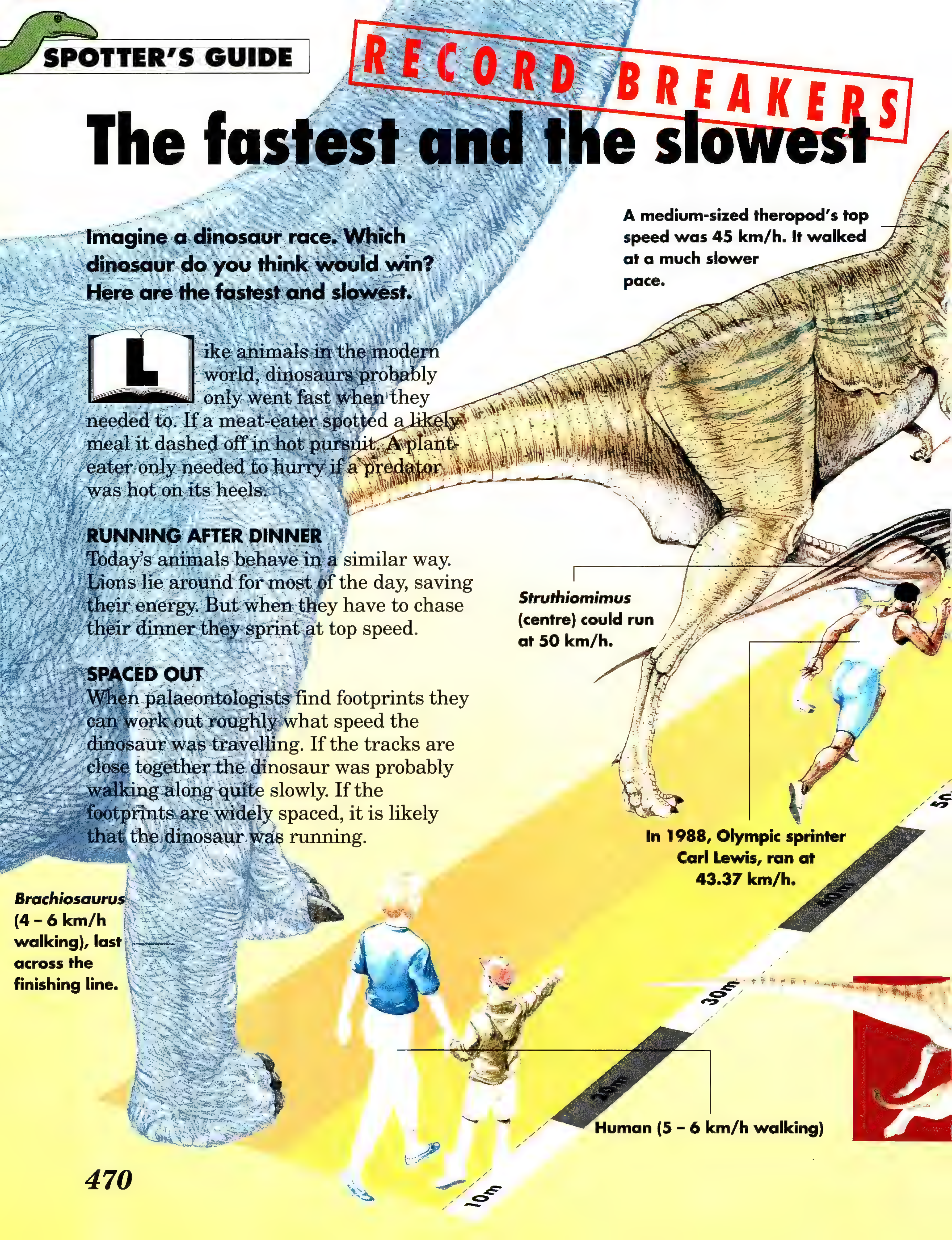
Like animals in the modern world, dinosaurs probably only went fast when they needed to. If a meat-eater spotted a likely meal it dashed off in hot pursuit. A plant-eater only needed to hurry if a predator was hot on its heels.

RUNNING AFTER DINNER

Today's animals behave in a similar way. Lions lie around for most of the day, saving their energy. But when they have to chase their dinner they sprint at top speed.

SPACED OUT

When palaeontologists find footprints they can work out roughly what speed the dinosaur was travelling. If the tracks are close together the dinosaur was probably walking along quite slowly. If the footprints are widely spaced, it is likely that the dinosaur was running.



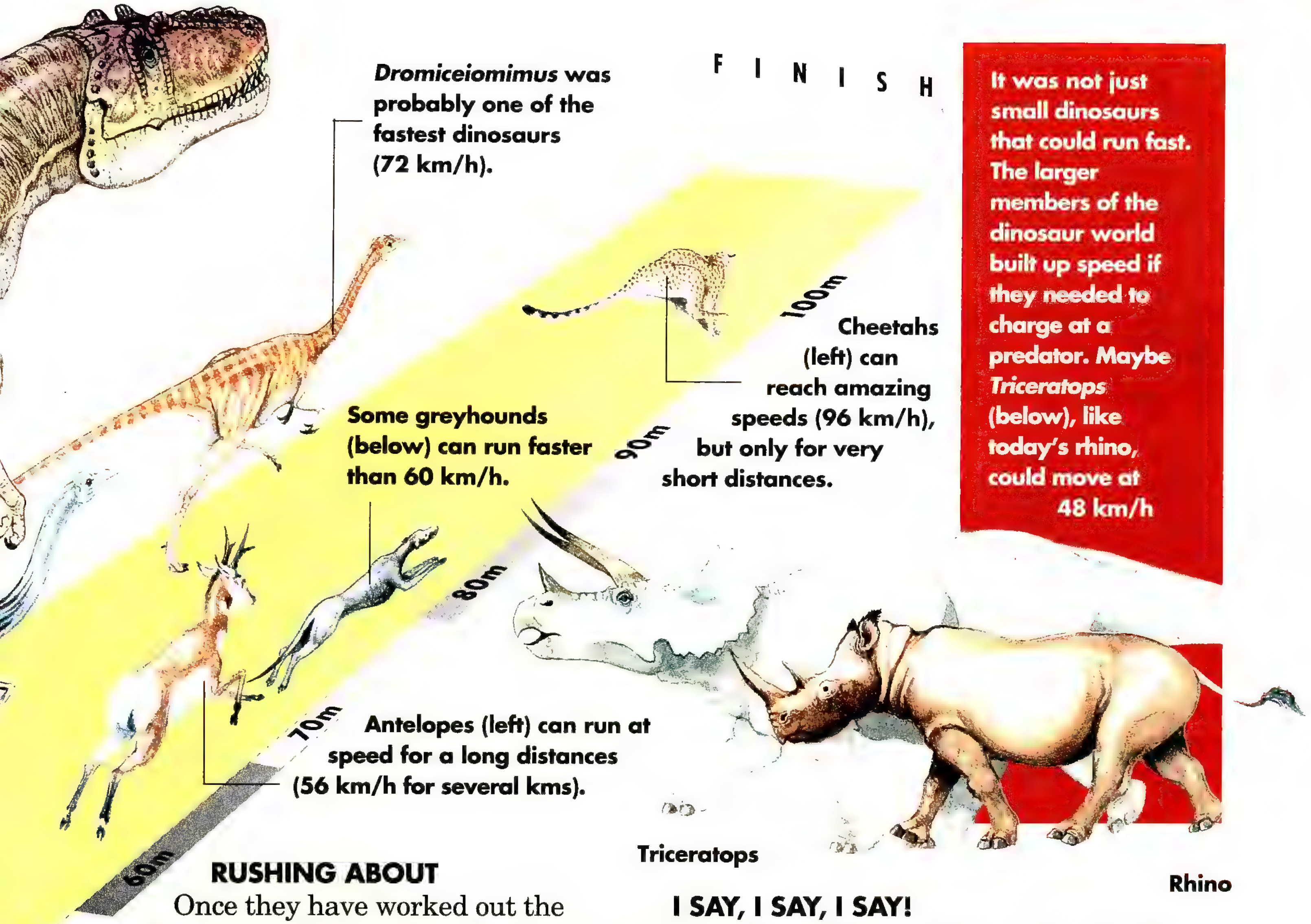
A medium-sized theropod's top speed was 45 km/h. It walked at a much slower pace.

***Struthiomimus* (centre) could run at 50 km/h.**

In 1988, Olympic sprinter Carl Lewis, ran at 43.37 km/h.

***Brachiosaurus* (4 – 6 km/h walking), last across the finishing line.**

Human (5 – 6 km/h walking)



***Dromiceiomimus* was probably one of the fastest dinosaurs (72 km/h).**

Cheetahs (left) can reach amazing speeds (96 km/h), but only for very short distances.

Some greyhounds (below) can run faster than 60 km/h.

Antelopes (left) can run at speed for a long distances (56 km/h for several kms).

It was not just small dinosaurs that could run fast. The larger members of the dinosaur world built up speed if they needed to charge at a predator. Maybe *Triceratops* (below), like today's rhino, could move at 48 km/h

Triceratops

Rhino

RUSHING ABOUT

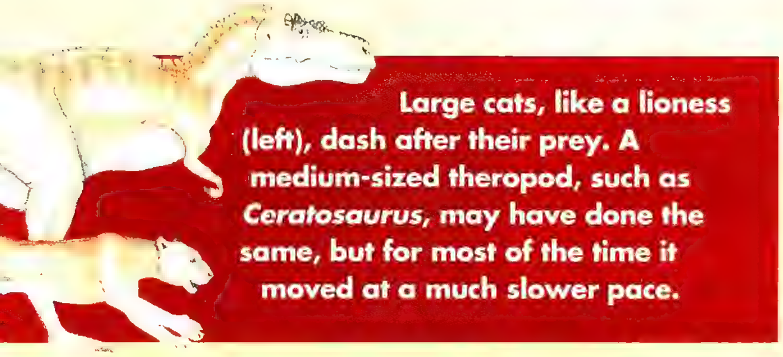
Once they have worked out the dinosaur's speed, scientists are faced with a tricky problem. Was the dinosaur moving at an average speed or was it going at full pelt? *Dromiceiomimus* is known to have gone at a lightning 72 km/h sometimes, but it is very unlikely that it dashed about at this speed all day! Its walking pace must have been much slower.

I SAY, I SAY, I SAY!

What's the difference between an ostrich and a greyhound? Obviously, one's a bird and one's a dog, but they do have some things in common too. They both have quite light bodies, relatively long legs and they are excellent runners. *Struthiomimius*, one of the fastest dinosaurs, also had long, muscular legs and a light body.

LARGE, BUT LIVELY

Triceratops certainly did not have a streamlined, agile body. But with its good acceleration it could suddenly speed up to charge at its enemies. Unlike sauropods, whose straight pillar-like legs had to support their massive weight, horned dinosaurs had quite flexible legs that allowed them to charge.



Large cats, like a lioness (left), dash after their prey. A medium-sized theropod, such as *Ceratosaurus*, may have done the same, but for most of the time it moved at a much slower pace.

Dinosaur descendants

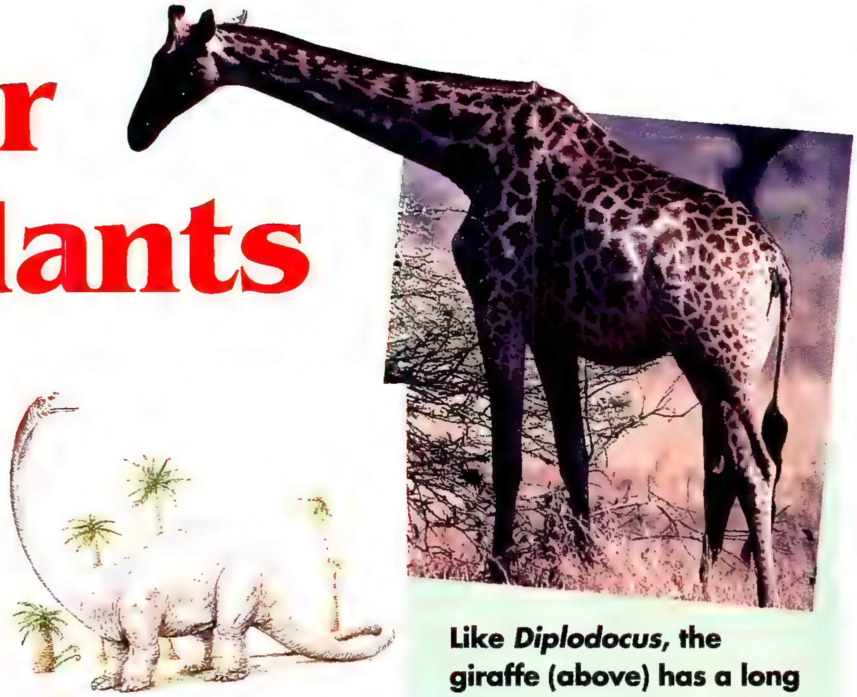
Which of today's animals can claim to be the dinosaurs' closest living relatives?

How do you tell which kind of modern animal is related to a dinosaur? It's not easy. Some creatures may look a bit like dinosaurs, but that is not enough. To be a real relative, their bones have to be similar and they have to behave in the same sort of way as well.

LOOK-ALIKES

Each of these three animals looks, or behaves in the same way as certain dinosaurs.

- A giraffe uses its long neck to eat from tree tops, like *Diplodocus*.
- An armadillo is protected by bony armour in the same way as *Ankylosaurus*.
- A rhinoceros looks like *Triceratops*, with its big stocky body and nose horn. Could they be related? None of these animals is related to dinosaurs. Giraffes, rhinos and armadillos are mammals. They are warm-blooded and they give birth to live babies. They come from a completely different animal family. Dinosaurs were reptiles. They were probably 'cold-blooded' and they laid eggs. So are today's reptiles the descendants of dinosaurs?



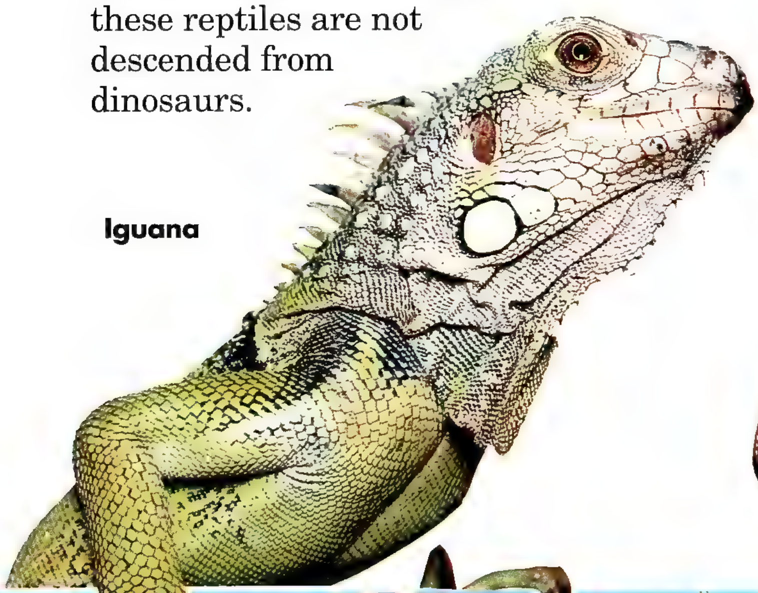
Like *Diplodocus*, the giraffe (above) has a long neck, but this does not mean they are related.

Ankylosaurus and today's armadillo have armour-plating, but aren't cousins.

Triceratops and today's rhinoceros have large horns and heafty bodies, but belong to completely different animal families.

NAMESAKE

Lizards are reptiles, but although the dinosaur *Iguanodon* was named after a modern lizard, the iguana, these reptiles are not descended from dinosaurs.



Iguana

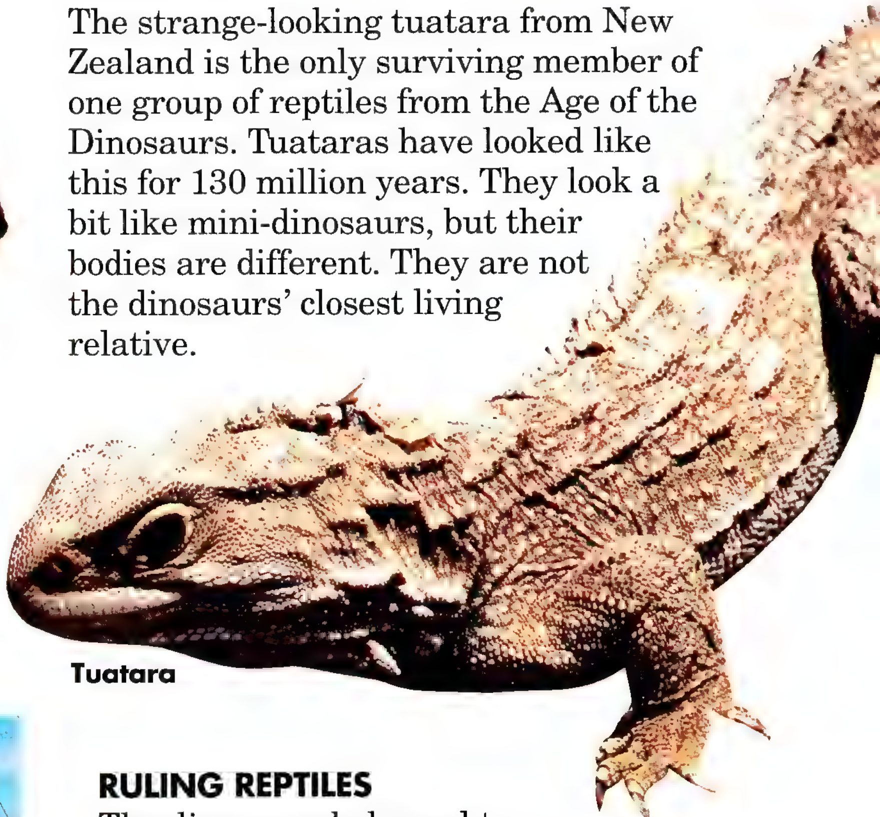
Leopard tortoise

TURTLES, TORTOISES AND TERRAPINS

These hard-shelled creatures are all members of another group of reptiles. Their groups survived when the dinosaurs died out. These reptiles still look more or less the same as they did 150 million years ago, when the dinosaurs were still alive. But they are not closely related to dinosaurs, they are a different branch of the family tree.

ALL ALONE

The strange-looking tuatara from New Zealand is the only surviving member of one group of reptiles from the Age of the Dinosaurs. Tuataras have looked like this for 130 million years. They look a bit like mini-dinosaurs, but their bodies are different. They are not the dinosaurs' closest living relative.



Tuatara

RULING REPTILES

The dinosaurs belonged to a major group of reptiles known as the archosaurs or 'ruling reptiles'. Crocodiles lived in the Age of the Dinosaurs. They were also descended from the archosaurs but they formed a different group from the dinosaurs. At one time, crocodiles were thought to be the dinosaurs' closest living relatives. But experts now think a much more unlikely creature is the true descendant of the dinosaurs........

Crocodiles have scaly skin like dinosaurs, but they are only very distant relatives.

COO-ER! IS THIS WHAT THE DINOSAURS HAVE BECOME?

It is hard to believe that a fluffy pigeon could have anything in common with a dinosaur. But it does. Many scientists believe that birds are the closest living relatives of the dinosaurs. The bones in the legs of a modern pigeon are arranged in a very similar way to those in the legs of meat-eating dinosaurs, such as *Deinonychus* and *Compsognathus*. Because of this, experts think the pigeon could have evolved from those dinosaurs.

BIRDS AND BEASTS

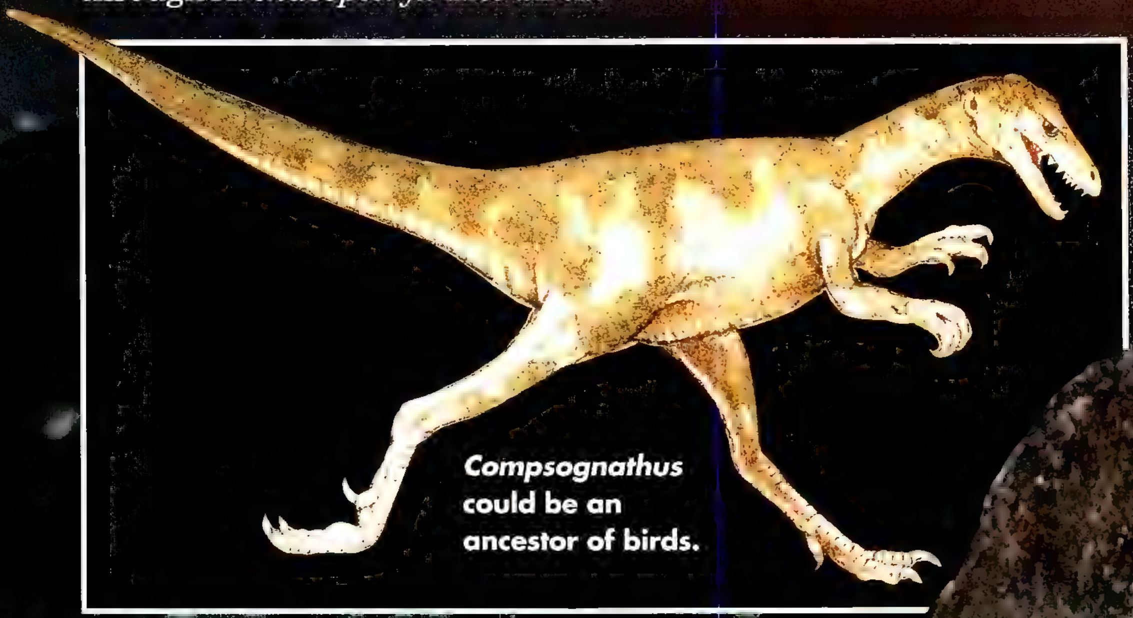
Birds may look very different from reptiles. But they do have some very important things in common. Birds have scales on their legs. They also lay shelled eggs like reptiles. Because of these things, experts think birds and reptiles must be related.

BIRD MIMICS

Certain types of dinosaurs, such as *Struthiomimus*, looked so much like birds, they are called 'bird mimics'. *Struthiomimus* means 'ostrich mimic' because it looked rather like, and probably ran as fast as, today's ostriches.

EARLY BIRD

Archaeopteryx is the earliest known bird. It lived 150 million years ago and could be the link between dinosaurs and today's birds. It looked very like a reptile with pointed teeth, claws and long bony tail. More importantly, its hip bones, arms and leg bones were almost identical to those of *Compsognathus*. So dinosaurs might have evolved through *Archaeopteryx* into birds.

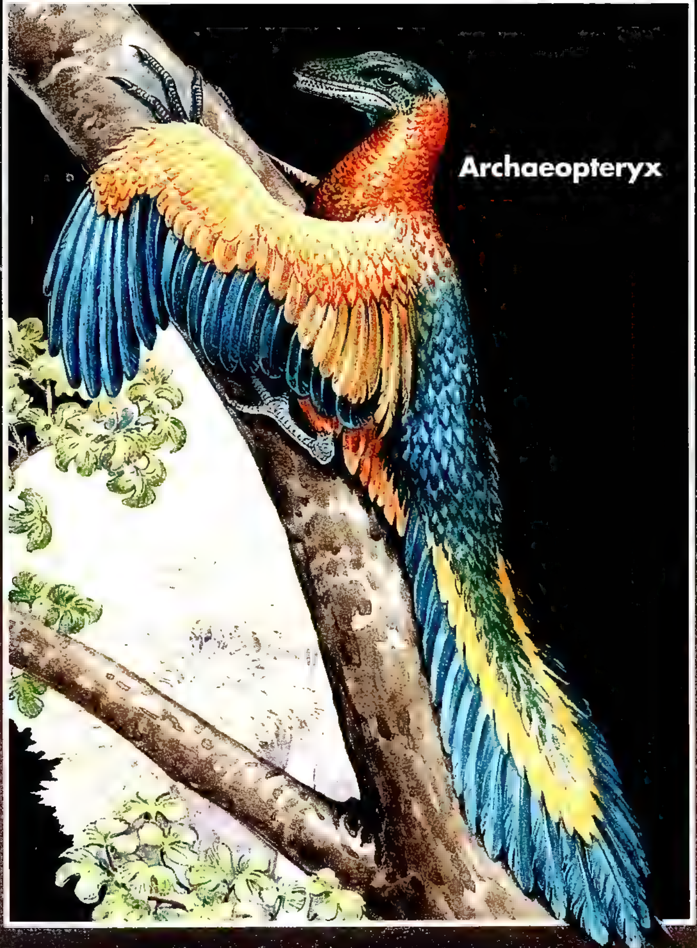


***Compsognathus* could be an ancestor of birds.**

CLAW WINGS

This hoatzin bird (left) looks rather like *Archaeopteryx*. The hoatzin bird lives in the forests of South America today. Young hoatzin birds have claws on their wings, like *Archaeopteryx* did. They use them to climb up trees.

The hoatzin bird (above) and the pigeon (left) are probably true dinosaur descendants. They are related to ancient *Archaeopteryx* (right) which scientists believe to be descended from the dinosaurs.



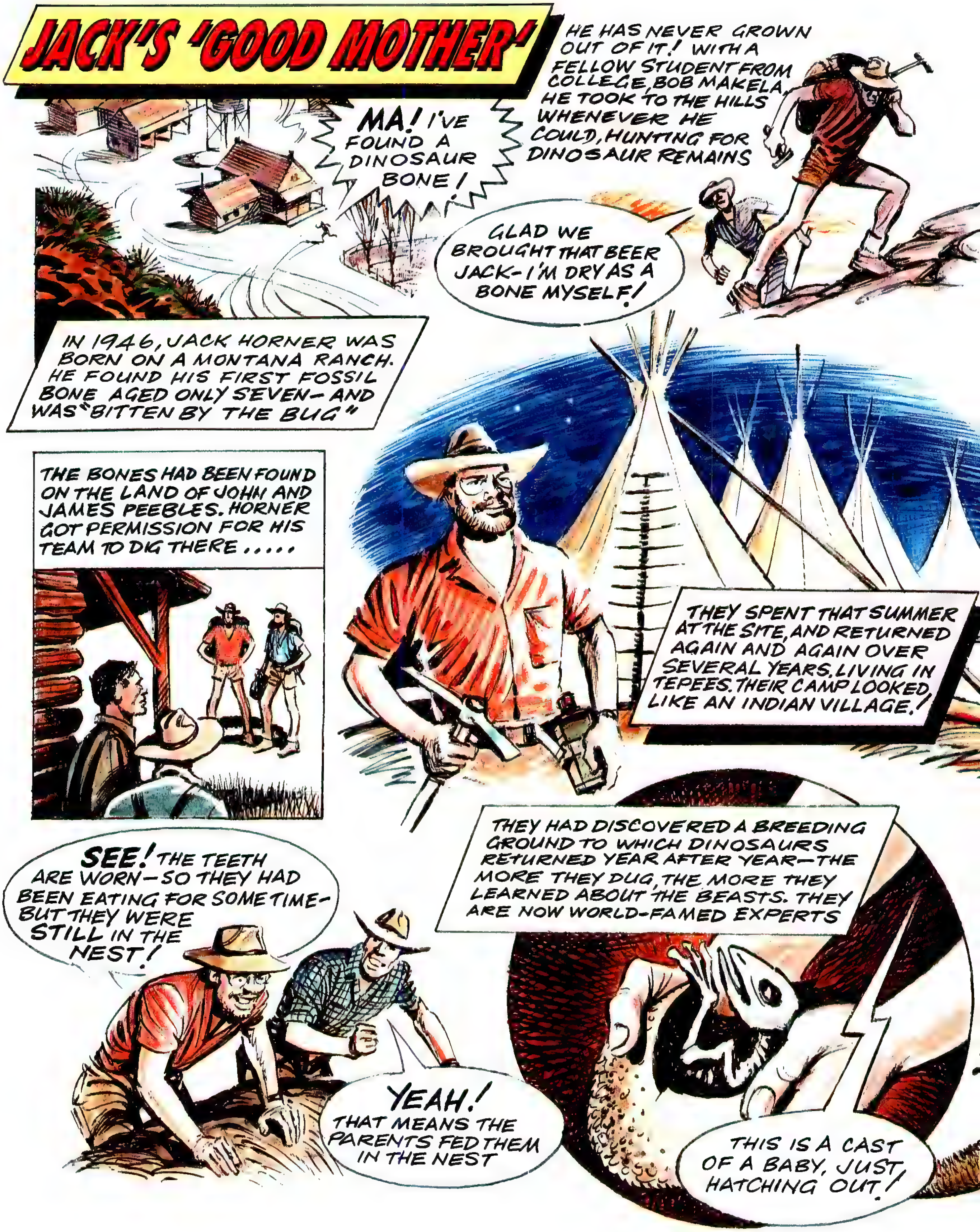
IT'S A FACT

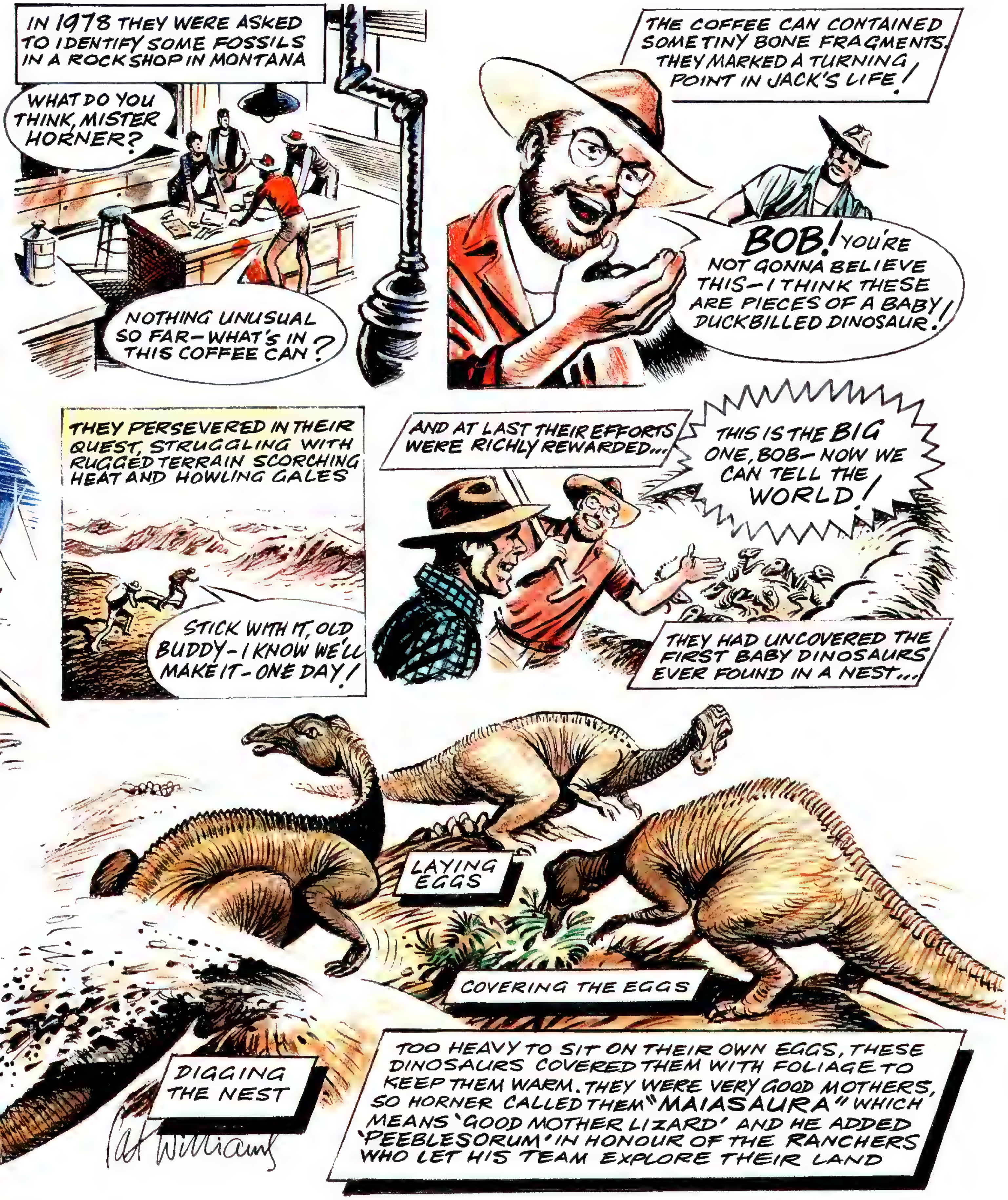
THIS BIRD COULD NOT FLY

Archaeopteryx could not fly very well. It probably used its feathered arms, or 'wings', to make short, fluttering jumps upwards to catch insects.

The pigeon that you feed in the park is probably one of the dinosaurs' closest living relatives.

JACK'S 'GOOD MOTHER'


MA! I'VE FOUND A DINOSAUR BONE!
IN 1946, JACK HORNER WAS BORN ON A MONTANA RANCH. HE FOUND HIS FIRST FOSSIL BONE AGED ONLY SEVEN– AND WAS "BITTEN BY THE BUG"
HE HAS NEVER GROWN OUT OF IT! WITH A FELLOW STUDENT FROM COLLEGE, BOB MAKELA, HE TOOK TO THE HILLS WHENEVER HE COULD, HUNTING FOR DINOSAUR REMAINS
GLAD WE BROUGHT THAT BEER JACK– I'M DRY AS A BONE MYSELF!
THE BONES HAD BEEN FOUND ON THE LAND OF JOHN AND JAMES PEEBLES. HORNER GOT PERMISSION FOR HIS TEAM TO DIG THERE.....
THEY SPENT THAT SUMMER AT THE SITE, AND RETURNED AGAIN AND AGAIN OVER SEVERAL YEARS, LIVING IN TEPEES. THEIR CAMP LOOKED LIKE AN INDIAN VILLAGE!
SEE! THE TEETH ARE WORN– SO THEY HAD BEEN EATING FOR SOME TIME– BUT THEY WERE STILL IN THE NEST!
YEAH! THAT MEANS THE PARENTS FED THEM IN THE NEST
THEY HAD DISCOVERED A BREEDING GROUND TO WHICH DINOSAURS RETURNED YEAR AFTER YEAR–THE MORE THEY DUG, THE MORE THEY LEARNED ABOUT THE BEASTS. THEY ARE NOW WORLD-FAMED EXPERTS
THIS IS A CAST OF A BABY, JUST HATCHING OUT!


IN 1978 THEY WERE ASKED TO IDENTIFY SOME FOSSILS IN A ROCK SHOP IN MONTANA
WHAT DO YOU THINK, MISTER HORNER?
NOTHING UNUSUAL SO FAR—WHAT'S IN THIS COFFEE CAN?
THE COFFEE CAN CONTAINED SOME TINY BONE FRAGMENTS. THEY MARKED A TURNING POINT IN JACK'S LIFE!
BOB! YOU'RE NOT GONNA BELIEVE THIS—I THINK THESE ARE PIECES OF A BABY DUCKBILLED DINOSAUR!
THEY PERSEVERED IN THEIR QUEST, STRUGGLING WITH RUGGED TERRAIN, SCORCHING HEAT AND HOWLING GALES
STICK WITH IT, OLD BUDDY—I KNOW WE'LL MAKE IT—ONE DAY!
AND AT LAST THEIR EFFORTS WERE RICHLY REWARDED...
THIS IS THE BIG ONE, BOB—NOW WE CAN TELL THE WORLD!
THEY HAD UNCOVERED THE FIRST BABY DINOSAURS EVER FOUND IN A NEST...
LAYING EGGS
COVERING THE EGGS
DIGGING THE NEST
TOO HEAVY TO SIT ON THEIR OWN EGGS, THESE DINOSAURS COVERED THEM WITH FOLIAGE TO KEEP THEM WARM. THEY WERE VERY GOOD MOTHERS, SO HORNER CALLED THEM "MAIASAURA" WHICH MEANS 'GOOD MOTHER LIZARD' AND HE ADDED 'PEEBLESORUM' IN HONOUR OF THE RANCHERS WHO LET HIS TEAM EXPLORE THEIR LAND
Pat Williams

Improve and test your knowledge with...

DINO Fact File

Triceratops holds all the answers. See how you score in the quiz.

1 *Dilophosaurus* may have been a 'scavenger'. What does this mean?
a) it ate carrion
b) it ate insects
c) it killed its own food

2 What shape were *Scelidosaurus'* teeth?
a) cone-shaped
b) peg-shaped
c) leaf-shaped

3 What did *Dilophosaurus* have on its head?
a) lots of bony lumps
b) two horns
c) a two-ridged crest

4 Where did *Harpymimus* live?
a) Mongolia
b) Mauritius
c) Mozambique

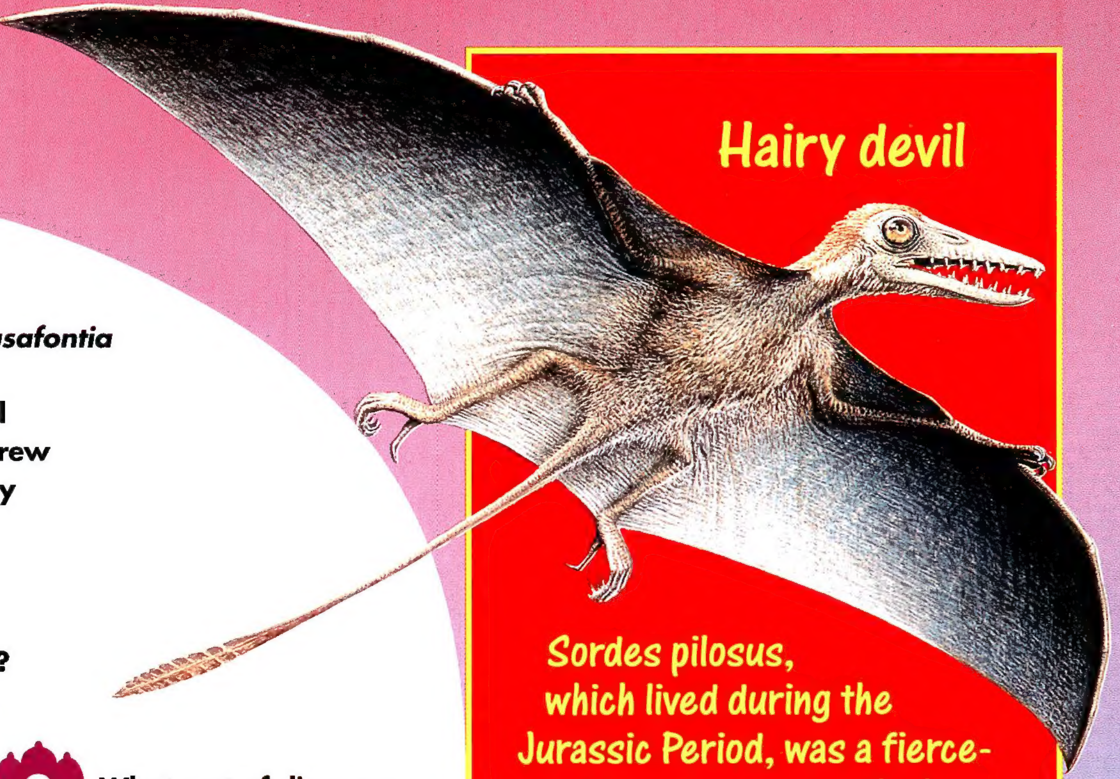
5 Why was *Shunosaurus* different from other sauropods?
a) it had a clubbed tail
b) it ate meat
c) it did not have a long neck

Dragon from Camelot

If only King Arthur knew that a dinosaur was named after his famous court, Camelot. The large plant-eating dinosaur, Camelotia, was so named, because its bones were discovered in Somerset, England, home of Arthur's legendary court.

The changing Earth

Not all fossilized footprints are found on the ground. A huge wall of rock in Argentina was discovered to have large dinosaur footprints across it. Not that dinosaurs could climb cliffs! The Earth's surface has moved a lot since the time of the dinosaurs and what was then a sea shore is now a steep cliff.



Hairy devil

Sordes pilosus, which lived during the Jurassic Period, was a fierce-looking pterosaur with sharp teeth and a body completely covered with hair. That is why scientists called it 'hairy devil'!

6 What did *Crusafontia* look like?

a) a modern squirrel
b) a modern tree-shrew
c) a modern wallaby

7 How long was *Halticosaurus'* head?

a) as long as a child's arm
b) as long as a car
c) as long as a pencil

8 What sort of dinosaur was *Hadrosaurus*?

a) a duckbilled dinosaur
b) a fierce meat-eater
c) a long-necked dinosaur

9 What does MTB stand for?

a) many-toothed beasts
b) mega tough bite
c) multituberculate

10 What does *Haplocanthosaurus* mean?

a) single-spined reptile
b) low-bellied reptile
c) four-footed beast

Not a dinosaur No 2

Plesiosaurus, a sea reptile with a rather long neck and flippers, is sometimes referred to as a dinosaur. However, although it lived in the time of the dinosaurs, it is a completely different species.

Still to uncover

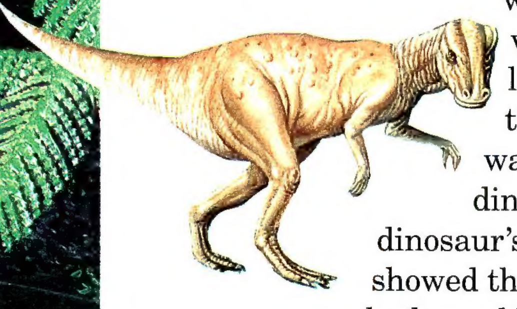
Palaeontologist know that there are still huge herds of dinosaurs buried deep underground. One of these burials has been estimated to have 40,000 skeletons! There are still thousands of dinosaurs to dig up for all you budding palaeontologists!

Answers to the questions on inside back cover

HADROSAURUS 80 MYA

Hadrosaurus (had-roe-saw-rus) lived in the Late Cretaceous Period in Alberta, Canada. Longer than two cars, this dinosaur probably walked on its hind legs. Plant-eating *Hadrosaurus* could deal with the toughest vegetation. It nipped off shoots with its toothless beak and ground them down with batteries of teeth.

At the time the headless fossil skeleton of *Hadrosaurus* was found in 1858, it was the most complete dinosaur skeleton in the world. The head was discovered later and showed that *Hadrosaurus* was a duckbilled dinosaur. The dinosaur's skull also showed that *Hadrosaurus* had an odd little hump in front of its eyes. At 8 – 10m long, *Hadrosaurus* lived up to its name – 'big lizard'.



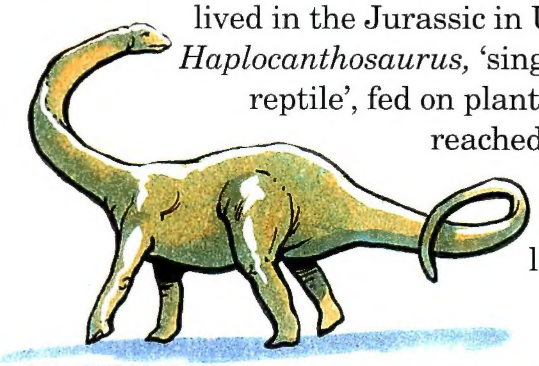
HALTICOSAURUS 210 MYA

Halticosaurus (hal-tik-oh-saw-rus) is known from two skeletons and a skull which were found in Germany. It was longer than two small cars and its skull was as long as a child's arm. *Halticosaurus* lived in the Late Triassic Period and was a meat-eater. It had neat, sharp teeth for attacking its prey. Its skull was light so that the dinosaur could move its head easily. *Halticosaurus* means 'springing reptile'.

MYA = MILLION YEARS AGO

HAPLOCANTHOSAURUS 150 MYA

Massive *Haplocanthosaurus* (hap-loh-kan-thoh-saw-rus) was longer than two buses. It lived in the Jurassic in USA. *Haplocanthosaurus,* 'single-spined reptile', fed on plants and reached the treetops with its long neck.

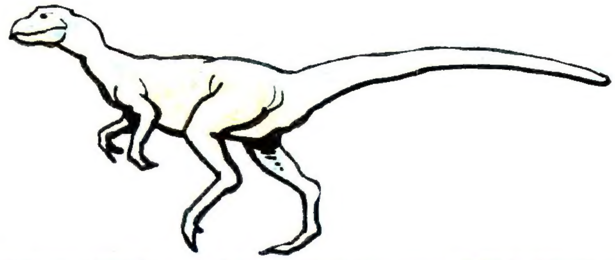


HARPYMIMUS 100 MYA

With its slim neck and long legs, *Harpymimus* (har-pih-mime-us) lived in the Cretaceous Period in Mongolia. Its name means 'harpy mimic' (a harpy is a mythical monster with a woman's face and a bird's wings and claws). It caught fast-moving lizards and insects, but it may also have eaten plants.

HERRERASAURUS 230 MYA

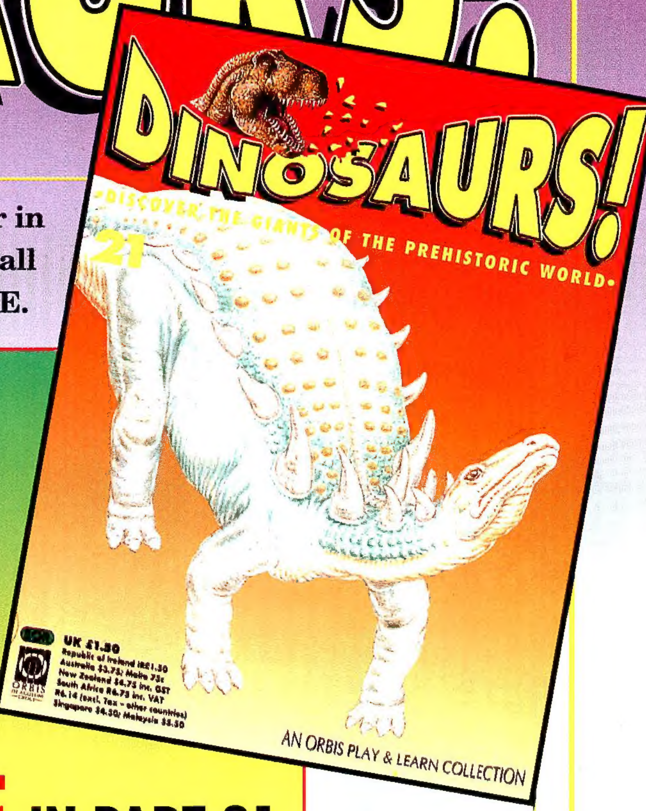
One of the oldest of all known dinosaurs, *Herrerasaurus* (hair-rare-ah-saw-rus) lived in north-west Argentina in the Late Triassic Period. Meat-eating *Herrerasaurus* ran on two legs and trapped its prey in long jaws lined with sharp, curved teeth. At the end of its arms, *Herrerasaurus* ('Herrera reptile') had small, clawed hands.



COMING IN PART 21 OF

DINOSAURS!

Take a look inside the stomach of a massive plant-eater in TIME DETECTIVE. Discover which is the rarest of all dinosaurs in SPOTTER'S GUIDE.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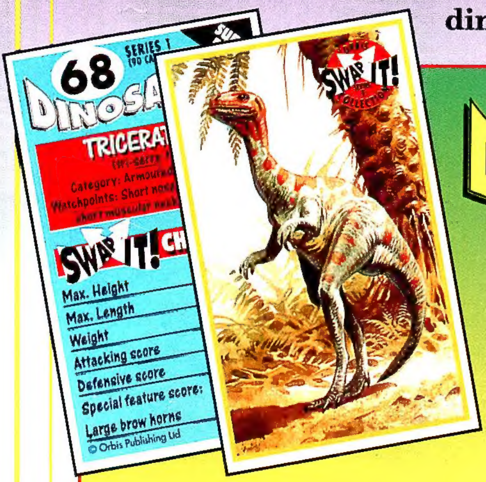

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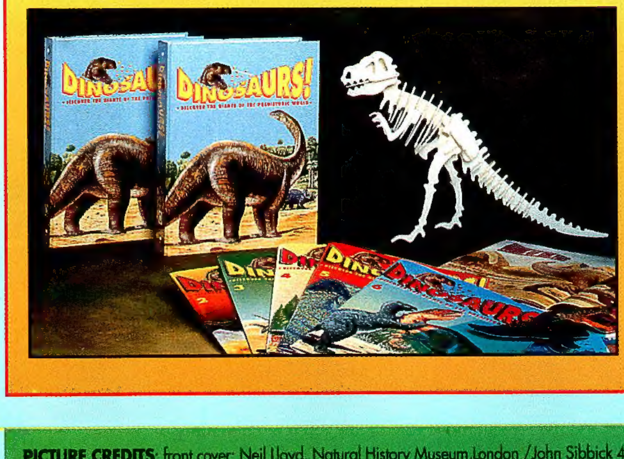

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Dr. David Norman of Cambridge University answers your dinosaur questions

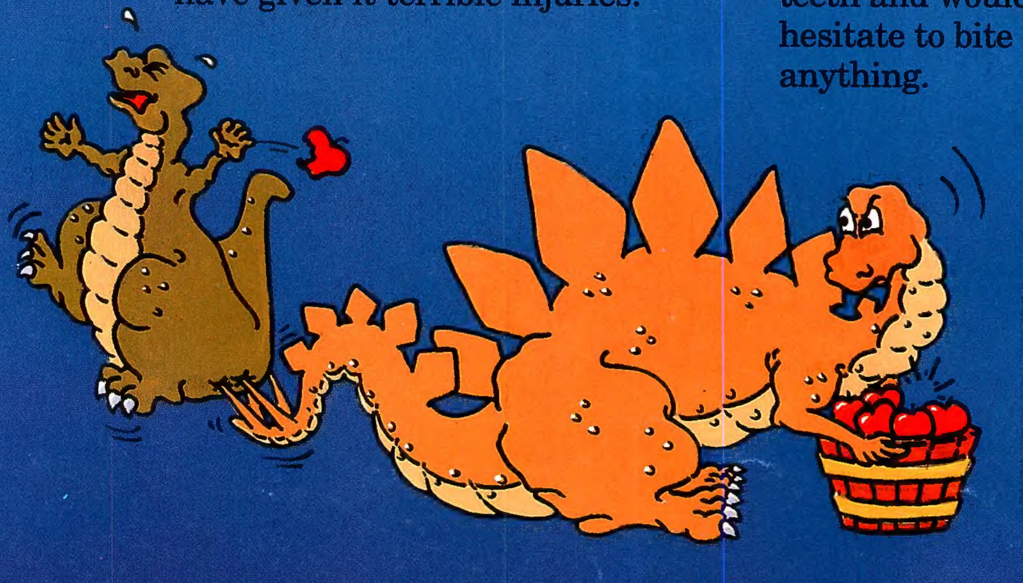
ASK THE EXPERT

Why did Brachiosaurus have such large nostrils?

At one time, scientists thought that *Brachiosaurus* may have spent some time in water and used its nostrils like a snorkel. But *Brachiosaurus* probably spent most of its time on land and used its huge nostrils to control its body temperature. *Brachiosaurus* would puff air in and out through its nostrils which would have helped to cool the blood in its head very effectively.

How did Stegosaurus protect itself from its enemies?

Stegosaurus protected itself with its tail. It swung its very spiky tail at its enemies. The swinging, spiked tail must have made it very difficult for an enemy to get near to *Stegosaurus*. If it did the spikes would have given it terrible injuries!



What subjects do I need to study at school to become a palaeontologist?

To be a palaeontologist you will need to study science at school. At university you will need to study biology or geology (or both together if that is possible). Choose a department that has a person who teaches palaeontology. From then on it is a matter of getting a good degree in your subject. After that you'll need to apply to a university to do research in an area of palaeontology that interests you. You could do this part of your study in your home country or go abroad.

Did baby dinosaurs bite?

Yes, most definitely! Even baby dinosaurs, like *Tyrannosaurus rex* young, had very sharp teeth and would not hesitate to bite anything.

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